# Cahoy Dec.
# Ex. 4

UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

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| IN RE: DA VINCI SURGICAL ROBOT ANTITRUST LITIGATION, | Lead Case No.: 3:21-cv-03825-VC |
| THIS DOCUMENT RELATES TO: ALL CASES | |
| SURGICAL INSTRUMENT SERVICE COMPANY, INC., Plaintiff, vs. INTUITIVE SURGICAL, INC., Defendant. | Case No. 3:21-cv-03496-VC |

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REMOTE PROCEEDINGS OF THE VIDEOTAPED DEPOSITION OF
GRANT DUQUE, IN HIS PERSONAL CAPACITY
TUESDAY, NOVEMBER 8, 2022

REPORTED BY NANCY J. MARTIN
CSR. NO. 9504, RMR, RPR
PAGES 1 - 178

THE WITNESS: Yes, I believe so.

BY MR. VAN HOVEN:

Q. And in one of -- we'll visit a number of long documents here. What I'd ask you to do is to take a look at the document generally to make sure that you have an -- understand the context of it. Then, as I ask you specific questions, feel free to take a step back and, you know, read specifics as we get into it. Does that process sound all right?

A. Yes, that sounds fine.

Q. Okay. So please take a look at this document and let me know when you're ready to discuss Exhibit 241.

(The witness reviewed the document.)

THE WITNESS: Okay.

BY MR. VAN HOVEN:

Q. So I'd like to start by talking about there's a section labeled "Drivers for Instrument Life" on the page ending in 299.

The first sentence there talks about, "In life testing, and clinical use, instrument end-of-life is gated by cable failures on instruments in both S/SI and XI platforms."

Do you see that?

A. I do see that, yes.

Q. What is a cable failure in the context of S/SI and XI instruments?

A. So cable failure would be failure for one of the drive cables for one of the wrist joints. So we have cable-driven joints for grip, yaw, and pitch.

Q. Got it. So if we're talking about, for example, for roll, there's a cable that connects the input disc via one or more pulleys to a component on the distal end that enables the roll?

A. That's not accurate for roll.

Q. How would you describe it for roll?

A. So for roll, that particular joint at one time was driven by cables. But on different instruments, and certainly on XI, that's driven by a gear.

Q. And how is the motion transferred from the gear to the distal end of the instrument?

A. We have a series of inline spur gears. So the rotation at the input disc is translated to the roll joint via two spur gears.

Q. Got it. And for the -- does the transfer of motion from the input disc of the pitch axis to the distal end of the instrument include a cable for XI?

A. Yes, it does.

Q. And also for S/SI?

A. Yes, that's correct.

Q. And do the yaw and grip inputs -- do cables couple from the input discs to the distal end of the instrument?

A. Can you rephrase that question?

Q. Sure. Is it okay to refer to kind of yaw and grip collectively because they function in a complimentary manner?

A. It depends on what you're talking about, but yes.

Q. And are there -- I guess could you describe for the XI the cables that connect from the yaw and grip input discs to the distal end of the instrument.

A. Okay. So for yaw and grip, they are cable pulley systems. And so the input discs are essentially acting as pulleys. A cable must wrap around those pulleys.

So there's a cable section at the back end, proximal end of the instrument. That then is connected via a hypotube, which is basically a stainless steel, metal tube, for the straight section that -- for the section of cable of the drive train that isn't required to go through a loop. So it's the straight section.

At the distal end, where the cable drive has

to connect through the wrist, there is another section of cable. That cable is routed through the pitch axis joint and then to a series of eyelet pulleys to route the cables through the wrist in a compact manner and then terminates in a way that's constrained to one of the pulleys on the yaw or grip joints.

And then you have a return cable that basically comes back down a similar path back to the other side of the input disc at the back end of the instrument.

Q. Got it. In that -- when we're talking about the cables for the yaw, grip, and roll, is that what's being referred to here as -- in terms of cable failures?

MS. CAHOY: Objection to form.

THE WITNESS: We have cable failures. Some of those cable failures could be the cables that we're discussing. There are other cables in the instrument. So depending on the context.

BY MR. VAN HOVEN:

Q. What other cables are there in the instrument?

MS. CAHOY: Objection to form.

THE WITNESS: For some instruments that have cautery energy capability, we have cables -- or wires

that are sometimes referred to as cables.
BY MR. VAN HOVEN:
Q. In addition, are there any other cables that you're aware of in the instruments other than what you've discussed?
MS. CAHOY: Objection to form.
THE WITNESS: Can I hear the question one more time?
BY MR. VAN HOVEN:
Q. Sure. I'll modify it slightly. Are there any other cables that you're aware of in the XI instruments other than what you've discussed?
A. There are other cables in some of our XI instruments.
Q. And what are those?
A. Some other -- some of our advanced instruments require additional electrical communication to the distal end. So there will be other conductor or wire or electrical signal wires in the instrument.
Q. Got it. So I'd like to go back to what you're discussing here. You're talking about cable failures on instruments. There's a list of -- there's a numbered list. One is cable breakage.
Do you see that?

A. I do.

Q. And there it refers to a drive cable breaks. Would a drive cable be referring to the type of cable that's used for transmitting pitch or yaw or grip?

A. Yes.

Q. Not an electrical cable?

A. That's correct.

Q. What is this referring to with the -- under bullet point 1?

A. I'm going to read it. "Cable breakage. A drive cable breaks typically at the wrist. The instrument axis ceases to function."

So my understanding of that is a drive cable of the joint breaking at the distal wrist.

Q. What do you understand a break to be? Does that mean that it snaps altogether?

A. Yes. It's a full break. Full separation.

Q. And what happens to a drive axis when the drive cable for that axis breaks?

A. Because it's -- we require that drive cable to be attached to the joint, that joint will no longer function. You'll lose the ability to control that joint.

Q. So if you turn the associated input disc, no motion will transfer to the wrist at the distal end?

A. Not necessarily.

Q. When might motion transfer to the wrist at the distal end?

A. It depends on the -- where the cable is broken. The mechanism that I described has two cables.

Q. Got it. So if you're -- so if it has two cables, it might -- there might be some motion that transfers to the wrist; is that right?

A. That's correct.

Q. Would that motion correspond to I guess the designed motion of the wrist?

A. Not necessarily.

Q. The -- No. 2 refers to cable stretch.

Do you see that?

A. I do.

Q. What is cable stretch?

A. Cable stretch -- let me read it here. "The drive cable overall stretch results in cable tension becoming so slack that the instrument no longer responds intuitively."

So what I'm reading there, what's being described there is the drive cables growing in length.

Q. And it says "no longer responds intuitively." What do you understand that to mean?

A. So "intuitive" means that when the user is controlling the masters at the console, that the motion -- that the instrument endofactor, what we call the slave, is responding in a way that is intuitive, meaning it -- it's responsive enough to control.

(The Reporter requested clarification.)

THE WITNESS: So the user controls what we call the masters. So they manipulate with their hands the master, the control, and then the endofactor is what we call the slave. So the master has to respond intuitively to the slave. And what I mean by that -- and I'm miming here -- is when you control the masters, like open and close the masters, that the slave is responding intuitively. It's responsive. If I rotate it, it also rotates.

BY MR. VAN HOVEN:

Q. So when you're talking about the console, you're talking about what the -- where the surgeon is controlling movement?

A. That's correct.

Q. And so essentially this -- what it's talking about with "no longer responds intuitively" is that the surgeon's movements are -- no longer accurately occur on the instrument tip?

A. That's correct.

Q. There's a third one called Cable Derailment here.

What's your understanding of what cable derailment is referring to?

A. The cable derailment refers to when a cable comes off of its intended path. Typically a pulley.

Q. So instead of being in -- my terms might not be right, but instead of being in the groove of the pulley, it's on the outside or edge or something?

A. That's correct.

Q. When that happens the -- it says here "the instrument axis ceases to function."

A. It says that when it derails, it loses cable tension and the instrument axis cease to function.

Q. What's your understanding of what's referred to by the instrument axis ceases to function with a derailment?

A. So with a derailment, the cable is no longer in its path. So it will typically lose tension because the preferred path keeps the -- it conserves the length of that cable path. So it would have the similar effect of cable stretch.

Q. And so what will the -- I guess what would the surgeon see who is attempting to operate an instrument in the case of a cable derailment?

MS. CAHOY: Objection to form.

THE WITNESS: There are multiple things that can happen. In the example that I gave with the cable stretch, it will fail to move intuitively.

BY MR. VAN HOVEN:

Q. What about in the example of cable derailment?

A. If a cable becomes derailed, it will lose tension. It will affect its intuitive motion.

Q. So it won't respond the way the doctor expects it to?

A. It will degrade in performance.

Q. Here you refer to cease to function; right?

A. It states that in 3, yes.

Q. What's the difference between ceasing to function and degrading in performance, if there is one?

A. I think it's different levels of degraded performance. You have degraded performance if it degrades to a certain threshold, then it's no longer functional.

Q. If the cable's on the pulley, that's a pretty serious -- if the cable is not on the pulley, that's going to be a pretty serious degrading in function; right?

Q. Does that appear to be the RMI [sic] and reliability presentation referenced in the attachment to your E-mail?

A. RMA Reliability Predictions. That appears accurate, yes.

Q. Do you see that Page 1 of this presentation is referring to RMA Analysis for possible life extension 27-18 [sic]?

A. Yes, I do.

Q. What's your understanding of what "possible life extension" is referring to?

A. Possible life extension was -- by my recollection would be when we were exploring the idea of doing the EUP program of instruments program that we released a couple years ago.

Q. Sorry. Did you say "EUP program of instruments"?

A. Correct. EUP.

Q. What is EUP?

A. The acronym is Extended Use Program.

Q. Is there a particular generation of instruments that the extended use program was implemented on?

A. It was implemented -- the EUP program is implemented on IS4000, a specific set of instruments.

Q. A specific set of XI or Gen 4 instruments?
A. That's correct.
Q. Was the extended use program implemented on any SI instruments?
A. It was not.
Q. And I'd like to go to the second slide of this presentation.
A. Okay.
Q. So this is titled 218592 Instrument Uses in 2018.
Do you see that?
A. I see that, yes.
Q. Then under there, it says "For the Top 6 Instruments."
A. I see that, yes.
Q. Do you have an understanding of what that's referring to?
A. I'm recollecting now -- I'm trying to recollect.
Q. Do you think that's -- sorry. Go ahead. I didn't -- go ahead.
A. I don't remember exactly. I can't recall, but looking at it now, it looks like a breakup of the different instruments, the Top 6 instruments over the last two years at this point in time. Uses.

instrument?

A. They're -- you have visual access. Yes, you do.

Q. And if we go up to your -- the original E-mail, you'll see that in the last paragraph you reference the electropolish cables as visible to customer design change?

A. I do.

Q. What did you mean by that?

A. That the cables on the wrist -- users do have visual access to it, particularly under the endoscopic view when you're under the console, you have magnification 3 to 10 times. And so it's visible to the customer.

Q. The changed appearance of the electropolish cables?

A. Correct.

Q. Then in the first paragraph you discuss taking the instrument as they are with no changes to their design.

Do you see that?

A. "Your assumption below is correct. Extended life testing currently in process is taking the instruments as they are with no changes to their design."

Then I list ProGrasp, Cadiere, FBF, and MSCND.

Q. Got it.

MR. VAN HOVEN: Could we bring up tab 1. This is Intuitive -- this will be -- sorry -- marked as Exhibit 260. This is Intuitive-00027622.

(Exhibit 260 was marked for identification.)

BY MR. VAN HOVEN:

Q. If you could take a look at that and let me know when you're ready to discuss the document.

A. Sure. I'm reading it now.

(The witness reviewed the document.)

THE WITNESS: Okay. I recognize the E-mail thread.

BY MR. VAN HOVEN:

Q. And part of what this is referring to is cracks on input discs; is that right?

A. That's correct.

Q. And, in particular, is it referring to cracks on input discs for XI instruments?

A. That's correct.

Q. Were cracks on input discs more a significant issue for XI instruments than they were for SI instruments?

this removal process you discussed; correct?

A. Correct.

Q. And that's happening within Intuitive's specified 10 uses or otherwise the surgery wouldn't be taking place; right?

A. Correct.

Q. So is that an acceptable failure mode to Intuitive?

MS. CAHOY: Objection to form.

THE WITNESS: The instance of an instrument not being able to remove from a cannula is assessed within our risk analyses documents. There is a risk score associated with it. I don't know what it is offhand, but depending on that risk score, we would have to have certain mitigations in place.

BY MR. VAN HOVEN:

Q. And the risk scores are essentially saying that some percentage of the time it's acceptable for that sort of failure to happen?

A. Can you state that one more time because that's a little bit more to unpack.

Q. Sure. Actually, let's look at it back in the context of Exhibit 263.

A. Okay.

Q. We were looking at the third paragraph of

your E-mail.

A. Yes, I see it.

Q. The second sentence talks about, "For higher-risk failures, the required confidence/reliability will be higher 95/95; and for lower-risk failures, this may be 90/90, and in some cases 85/85."

Do you see that?

A. I do. I do.

Q. Is that what you're talking about when you're talking about risk scores?

A. No. No, that's not the same thing.

Q. What do you mean by "risk scores" when you were talking before?

A. Oh, sorry. RPN values. So when we do our failure modes and effects analysis, I call them RPN scores. It's the severity of the risk. It's the occurrence rate of the risk, and the detection rate of the risk. So there are three separate scores, and we multiply that and we use that to, you know, quantify the level of risk.

Q. And essentially there's a level under which a risk is acceptable to -- for putting an instrument out in the field?

A. That's not accurate. Can you ask that

question again.

Q. Sure. You said there are three separate scores that you multiply and quantify the level of risk; right?

A. Right.

Q. So you end up with a number?

A. That's right.

Q. That quantifies the level of risk; right?

A. So that gives an RPN score, is what we call it. But I'll call it a risk score for our FMEA.

Q. And those -- and those risk scores influence the confidence and reliability numbers you're referring to in Exhibit 263?

A. Yes, they do.

Q. How do they inform those?

A. So if it's -- depending on the -- that risk score, if it's above a certain threshold number, we identify those as high risk. And then there's a certain threshold for those RPN scores that would be considered lower risk and then there's also ones that the RPN score are even much lower than that.

So there are multiple tiers of that RPN score. And per our operating procedure that defines the reliability testing, high-risk failures have to have a confidence and reliability of this 95/95

number, and subsequently the other risk categories have a requirement to meet that 90/90, and lastly the 85/85 confidence and reliability.

Q. So the 85/85 correspond to the lowest risk level?

A. Amongst these three, yes.

Q. The 95/95 amongst those three is the highest risk level?

A. Yes.

Q. And so if you look at a failure mode and you see that it's tested to 95/95, you know that's a high-risk failure mode; right?

A. You do know that it's of that certain class.

I want to retract. Some of the labeling I've used, high risk versus low risk, that might not be entirely accurate for how they're described in our DOP.

Q. But it's on the highest level of risk testing for confidence reliability testing?

MS. CAHOY: Objection to form.

THE WITNESS: As I'm aware, yes.

BY MR. VAN HOVEN:

Q. And -- but so that's the way that you would understand those ratings, is to look at the associations between particular failure modes and

these confidence reliability requirements?

A. When we're establishing the pass/fail criteria for a liability protocol, we look at the various failure modes, and they identify them from our FMEA risk analyses documents as the category that requires either 95/95 or 99D or the 85/85. I just -- I want to shy away from the high versus low versus -- I don't think that descriptor is correct.

Q. Yeah. I understand you don't want to put absolute labels on them. But the 95/95 are I guess the higher as compared to 85/85 and 99/90 [sic]; is that right?

A. That's correct.

Q. So do you know someone at Intuitive named Proball Mitra?

A. I know Proball. I think it's the same person.

Q. What is your understanding of Proball's role at Intuitive?

A. Proball is a systems analyst. Apparently he's a system analyst manager. So he manages an SA team. He works within the single port business unit at Intuitive.

Q. Do you know someone named Josh Radell?

A. I do know Josh Radell.

in his capacity as a systems analyst.

Q. And when did you kind of -- I guess it sounds like you interacted with him to some degree. When was that? While he was a systems analyst?

A. I believe so. I'm not -- I'm not for sure.

MR. VAN HOVEN: All right. I don't have any further questions on this portion of the deposition. I don't know if Dan has anything.

MR. McCUAIG: No, I do not.

MR. VAN HOVEN: Anything from you, Kate?

MS. CAHOY: Yeah. I have just one question, which is on Exhibit 258.

EXAMINATION

BY MS. CAHOY:

Q. Mr. DuQue, do you recall when counsel was asking you about electropolished cables on the large needle driver?

A. I do.

Q. Why did Intuitive incorporate electropolished cables onto the large needle driver for the extended use instruments?

A. As we were aware, and as I actually mentioned in this E-mail, our large needle driver at the point of this E-mail was not -- in various life testing or

reliability tests, was barely reaching 10 lives.

When we kicked off the EUP program, large needle driver was one of the desired instruments to add to that portfolio and -- in addition to the other ones.

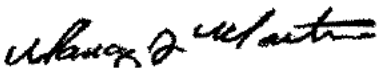
We kicked off life testing on the other instruments, but we -- I told the team, instructed the team that we do not test LND because it would be a waste of time. Our LND instruments at that point in time would barely be 10. So we weren't expecting to achieve any additional qualification for additional lives.

So we knew that we had to make some specific design changes to explore improving the robustness of that particular instrument. Electropolish was something that we had been exploring in different -- electropolished cables is something we had been exploring on other programs. So we thought it would be a good, quick effort to try to achieve some extra life.

MS. CAHOY: I don't have any further questions, but I will designate the entire transcript as "Highly Confidential, Attorneys' Eyes Only," and request 30 days for the witness to review the transcript for any errors.

C E R T I F I C A T E

I do hereby certify that the aforesaid testimony was taken before me, pursuant to notice, at the time and place indicated; that said deponent was by me duly sworn to tell the truth, the whole truth, and nothing but the truth; that the testimony of said deponent was correctly recorded in machine shorthand by me and thereafter transcribed under my supervision with computer-aided transcription; that the deposition is a true and correct record of the testimony given by the witness; and that I am neither of counsel nor kin to any party in said action, nor interested in the outcome thereof.



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Nancy J. Martin, RMR, CSR

Dated: November 18, 2022

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